Space Weather Forecast

Issued on Thursday, 21 September 2023 at 13:34 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of minor geomagnetic storms Day 2 and 3 (22 and 23 Sep). Isolated R1-R2 Minor/Moderate Radio Blackouts likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours. A high-end Moderate-class flare was observed from the largest and most complex sunspot region on the visible disc, situated in the northeast. There are fourteen sunspot regions on the visible disc. Most of the regions have remained relatively stable with little change observed, however, there has been some rapid emergence of a sunspot group in the northwest. There is some magnetic complexity to this region that could allow for an increased risk of significant flares going forward.

A coronal mass ejection (CME) associated with the Moderate-flare mentioned above departed the Sun towards the southeast on 20 Sep. The feature has been analysed and a glancing impact of Earth is considered likely on Day 3 or 4 (23 or 24 Sep).

Solar Wind / Geomagnetic Activity: Solar winds showed a steady decline during the first half of the period, falling from an initial elevated peak around 500-530km/s at the start of the period, down to 420km/s by 21/0415 UTC. Since then the slightly elevated winds have remained largely steady, varying between 400-440km/s. over the past 24hrs, from initially elevated levels at the start of the period, down to slightly elevated levels currently. The Interplanetary Magnetic Field (IMF) was at weak levels. The important north-south component also varied weakly. Resultant Geomagnetic activity was at Quiet to Unsettled levels (Kp1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Low to Moderate, with further isolated Moderate flares likely each day of the forecast period.

Solar Wind / Geomagnetic Activity: Solar winds are at Slightly Elevated levels to start the period. High-speed stream and minor CME effects are likely to impact the forecast between Days 2 and 4 (22-24 Sep). Geomagnetic activity is expected to be at mainly Quiet levels on Day 1 (21 Sep) and much of Day 2 (22 Sep). Either late on Day 2, or early on Day 3 (22-23 Sep) more predominantly Unsettled to Active levels are expected, with a chance for G1 Minor Storm (Kp5) intervals. Activity should ease to Quiet or Unsettled by Day 4 (24 Sep).

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with only a very slight chance of an enhancement should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	40	40	5
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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